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18. (Amended) The method of claim 16, further comprising **[the step of]**:

[(d)] normalizing said correlations.

20. (Amended) The method of claim 6, further comprising **[the step of]**:

[(d)] rotating said pseudonoise sequence by 45° prior to performing said correlations.

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21. (Amended) The method of claim 20, further comprising **[the step of]**:

[(e)] normalizing said correlations.

REMARKS

Reconsideration of the above-identified patent application in view of the amendments above and the remarks following is respectfully requested.

Claims 1-23 are in this case. Claims 1, 4 and 5 have been rejected under § 103(a). Claims 2 and 3 have been objected to. Claims 6-23 have been allowed. Independent claims 1 and 6 and dependent claims 4, 5, 12, 14, 18 20 and 21 have been amended.

The claims before the Examiner are directed toward a cellular telephony searcher and toward a method by which mobile stations of a cellular telephony network identify multipath channels to use to communicate with base stations. In particular, the searcher includes a plurality of correlators for correlating a received signal with a pseudonoise sequence, an input mechanism for inputting the pseudonoise sequence into the correlators with different delays, and a delay management mechanism for initializing and changing the delays. For each correlator,

the change applied to that correlator's delay depends only on the output of that correlator.

§ 103(a) Rejections - Dixon et al. '515 in view of Nakamura '693

The Examiner has rejected claims 1, 4 and 5 under § 103(a) as being unpatentable over Dixon et al., U. S. Patent No. 5,396,515 (henceforth, "Dixon et al. '515") in view of Nakamura, U. S. Patent No. 5,216,693 (henceforth, "Nakamura '693"). The Examiner's rejection is respectfully traversed.

Dixon et al. '515 teach a DSSS receiver with a single correlator that continuously correlates a reference pseudonoise sequence with a received baseband signal. Whenever the correlation exceeds a threshold, an output data symbol is generated.

Nakamura '693 teaches a DSSS communications system in which the receiver correlates the received signal, not with a conventional pseudonoise sequence, but with a pseudonoise sequence that has been subjected to both return zeroing and Manchester coding. As illustrated in Figures 2 and 7, the cross-correlation function of such an enhanced pseudonoise sequence with a conventional pseudonoise sequence has superior properties, with respect to synchronizing the receiver with the system's transmitter, as compared to the autocorrelation function of a conventional pseudonoise sequence. Alternatively, the transmitter time-multiplexes several data streams by modulating a return zeroed and Manchester encoded pseudonoise sequence with the data streams, and the receiver correlates the received signal with a conventional pseudonoise sequence to recover one or more of the data streams.

The Examiner contends that Dixon et al. '515 teach a DSSS receiver that includes a plurality of correlators. In fact, the DSSS receiver of Dixon et al. '515 has only one correlator. This is stated explicitly in column 1 lines 64-66:

> An object of the present invention is to provide an apparatus for acquiring a spread spectrum signal with only one correlator... (emphasis added)

Applicant speculates that the Examiner misinterpreted the circled plus signs in Figure 3 of Dixon et al. '515 as correlators. In fact, these circled plus signs represent modulo 2 comparators, as stated in column 4 lines 53-59:

> Each chip of the received spread spectrum signal is modulo **2** added with each respective chip of the reference pseudo-noise signal by modulo **2** comparators **40**. This modulo **2** addition of the two signals generates a plurality of chip-comparison signals which are transferred from modulo **2** comparators **40** to summer **41**.

Although reference numeral **40** does not appear in Figure 3, it is clear that the circled plus signs in Figure 3 represent modulo 2 comparators **40** because of the arrows leading from the circled plus signs to summer **41**, indicating that summer **41** receives its inputs from the circled plus signs. The combination of the modulo 2 comparators and summer **41** constitutes a single correlator.

By contrast, the searcher of the present invention includes a plurality of correlators, as recited clearly in claim 1(a).

The Examiner further contends that Nakamura '693 teaches a shift register for delaying the input of a pseudonoise sequence to a correlator, and that Nakamura '693 also teaches a delay management mechanism for changing the delay with which the pseudonoise sequence is introduced to the correlator in accordance with the correlator's output. The Examiner's contention is based on several misinterpretations of Figures 12 and 13 of Nakamura '693.

Starting with Figure 13, in the system illustrated in Figure 13, the transmitter modulates a conventional pseudonoise sequence with the message to be transmitted, and the receiver correlates the received signal with a return zeroed and Manchester encoded pseudonoise sequence. This is stated in column 10 lines 44-46:

> This embodiment if (sic.) for the purpose of high-speed initial synchronization by using the code sequence shown in FIG. 10 on the receiver. (emphasis added)

Reference numeral **66** refers, not to a PN code generator, but to a multiplexer (column 10 line 41). As best understood, the label "PN CODE GENERATOR" next to reference numeral **66** refers not to the box immediately above reference numeral **66**, which is clearly labeled "MULTIPLEXER", but to elements **63**, **64**, **65**, **66**, **67** and **68** collectively as the mechanism for generating the return zeroed and Manchester encoded pseudonoise sequence. This enhanced pseudonoise sequence passed on to correlator **69** with no delay for cross-correlation with the received signal. Shift register **64** is used, not to delay the enhanced pseudonoise sequence that is correlated with the received signal, but to produce the enhanced pseudonoise sequence that is correlated with the received signal.

Turning now to Figure 12, the receiver illustrated in Figure 12 is intended for use with the transmitters illustrated in Figures 9(a) and 11(a), as stated in column 10 lines 13-15. These transmitters multiplex six different data streams by modulating a return zeroed and Manchester encoded pseudonoise sequence with the data streams. The receiver illustrated in Figure 12 correlates six instances of the received signal with six correspondingly delayed instances of a conventional pseudonoise sequence, as described in column 10 lines 18-24:

> The circuit of FIG. **12** uses a shift register **51** instead of the variable delay circuit **39** of FIG. **9**, and generates PN codes corresponding to each data channel. For each data channel, the correlator **52** correlates

the received signals with the PN code generated by shift register **51**, and reproduces a plural number of data simultaneously.

The respective delays are constant, corresponding to the delays imposed on the data streams by shift register **32** of the transmitter of Figure 9(a) or by shift register **42** of the transmitter of Figure 11(a). The only change ever made to the delays is made collectively by voltage control oscillator **55** in the course of tracking the received signal. No change is ever made to any delay contingent only on the corresponding output of correlator **52**.

Thus, the prior art cited by the Examiner has nothing whatsoever to do with the invention recited in claim 1. Figure 13 of Nakamura '693 does not teach applying a delay to a pseudonoise sequence that is correlated with a received signal. Figure 12 of Nakamura '693 does not teach applying a variable delay to a pseudonoise sequence, that is correlated with a received signal, in accordance with the output of a correlator. Even if such a delay were taught in Figure 13 of Nakamura '693, and even if such a variable delay were taught in Figure 12 of Nakamura '693, it would not be obvious to combine the teachings of Figure 13 of Nakamura '693 with the teachings of Figure 12 of Nakamura '693, because these two Figures teach totally different kinds of DSSS receivers: the receiver of Figure 13 correlates the received signal with an enhanced pseudonoise sequence, whereas the receiver of Figure 12 correlates the received signal with a conventional pseudonoise sequence. Finally, even if Nakamura '693 had taught both a shift register for delaying the input of a pseudonoise sequence to a correlator and a delay management mechanism for changing the delay with which the pseudonoise sequence is introduced to the correlator in accordance only with the correlator's output, these teachings could not be combined with the teachings of Dixon et al. '515 to produce a DSSS receiver, with several correlators, that delays the

input of a pseudonoise sequence to each correlator in accordance with the output of the correlator, because the receiver of Dixon et al '515 has only one correlator. It follows that claim 1 is allowable as submitted.

With independent claim 1 allowable in its present form, it follows that claims 4 and 5, that depend therefrom, also are allowable.

Objections

The Examiner has objected to claims 2 and 3 as being based on rejected base claims. The Examiner has noted that claims 2 and 3 would be allowable if rewritten in independent form including all the limitations of the base claim and any intervening claim.

In view of the discussion above in the context of the § 103(a) rejections, Applicant submits that the base claims from which claims 2 and 3 depend are allowable, making claims 2 and 3 allowable in their present form.

Amendments to the Claims

Purely stylistic amendments have been made to independent claims 1 and 6 and to dependent claims 4, 5, 12, 14, 18, 20 and 21. Specifically, the labels of the elements and subelements of the claims have been removed, and the phrase "the steps of" has been deleted from the method claims.

Amendments to the Specification

The Summary of the Invention has been deleted.

On page 13 line 21, the font of reference numeral "10" has been changed to boldface, for stylistic consistency with the rest of the specification.

No new matter has been added.

In view of the above amendments and remarks it is respectfully submitted that independent claims 1 and 6, and hence dependent claims 2-5 and 7-23 are in condition for allowance. Prompt notice of allowance is respectfully and earnestly solicited.

Respectfully submitted,

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